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DWR WAREHOUSE

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July 28, 1997

CALFED Bay - Delta
1416 Ninth Street, Suite 1155
Sacramento, California 95814

Dear CALFED:

We thank you for the opportunity to submit this grant proposal. The Suisun Resource Conservation District and the Suisun Marsh landowners are excited about the prospects of seventeen more fish screens, and continuing with the implementation of the Suisun Marsh Fish Screen Program. With the seventeen new screens added to the twelve screens in place, we would have all top priority and critical habitat areas in the Marsh screened. This funding would help reduce the stressors on many endangered species relying on the Suisun Marsh.

Sincerely,

Lee Lehman
SRCD Executive Director

SUISUN RESOURCE CONSERVATION DISTRICT
2544 Grizzly Island Road
Suisun, CA 94585
(707) 425-9302
(707) 425-4402 FAX

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I. EXECUTIVE SUMMARY

The Suisun Marsh Fish Screen Program
Suisun Resource Conservation District (SRCD)

The objective of this CALFED proposal is to complete the screening of all priority 1, 2, and 3 water diversions in the Suisun Marsh. Currently there are 17 priority diversions which are not covered under the existing program. SRCD's Suisun Marsh Fish Screen Program is now in its second year, with five screens installed and operating in 1996 and another seven under construction this year. The ecological and biological importance of the fish screens is to decrease the entrainment of sensitive fish species while allowing private landowners to manage the seasonal wetlands. With endangered and threatened species both inside the diked seasonal wetlands and outside in adjacent waterways, the fish screens will play a vital role in their recovery.

The Suisun Marsh supports resident populations of delta smelt, Sacramento splittail, green sturgeon, and striped bass. It also serves as a migration corridor and rearing habitat for adult and juvenile winter-run and spring-run chinook salmon, and steelhead. Migratory birds are abundant in the Marsh and utilize the seasonal wetlands for food, cover and nesting. The open shallow water habitat within the wetlands are used by shorebirds, ducks, and geese while the emergent plants provide refuge for neotropical migrants and resident bird species.

The brackish water environment of the Suisun Marsh requires more intense management than a fresh water system due to the seasonally changing salinity levels and accumulation of salts in the soil. Under Assembly Bill 1717 the State and private landowners in the Suisun Marsh are required to manage their properties for wildlife habitat, however, current water intake restrictions imposed because of sensitive species concerns severely restrict management activity, which is resulting in poor quality habitat. For example, because of current endangered fish species permit restrictions, water intake through unscreened diversions is limited to four months in dry years. In above normal water years, when the channel water is more fresh and private landowners can effectively reduce soil salinities and grow more desirable food and cover plants, water intake is restricted or closed for 6 months, preventing landowners from utilizing this good quality water.

The SRCD began working with the California Department of Fish and Game (CDFG) to develop and implement the Suisun Marsh Fish Screen Program in response to the Reasonable and Prudent Measures outlined in SRCD's U.S. Army Corps of Engineers regional maintenance permit (PNR20066E98) Section 7 Biological Opinions for the Sacramento River winter-run chinook salmon and delta smelt. CDFG prioritized diversion screening in the Suisun Marsh based on information obtained from surveys of critical habitat areas of delta smelt, Sacramento splittail and winter and spring - run chinook salmon.

Phase one and two of the screening program included screening the highest priority diversions in the Marsh. If funded under CALFED, our goal is to complete the screening of priority 1, 2 and 3 diversions. This goal includes the design, construction, and installation of 17 screens in 1998. At a cost of $5 million to complete, the project would protect and enhance delicate fish populations as well as nearly 8000 acres of seasonal wetlands. Design and planning would start in February and March of 1998 with construction and installation taking place July through September of 1998.

Legislative restrictions dictate that lands must be managed for wildlife, which prevent private lands from being converted to agriculture. As a result of the restrictions, the private landowners of the Suisun Marsh receive no income from the sale of agricultural crops or water. The landowners are strictly spending out of pocket money to help create better wildlife habitat and need help to comply with these restrictions to create the best habitat possible, and to limit impacts to fisheries and other important and endangered species. The installation of the fish screens is made possible only with the help of state and federal funds.

According to the Ecosystem Restoration Program Plan (ERPP), Suisun Marsh is listed as a significantly important area to many species. The ERPP states that incidental take through diversions as one of the primary stressors on fish in the Suisun Marsh. The fish screening program will help alleviate the pressure and stress on numerous fish species by screening diversions in critical habitat areas and at the same time protect the seasonally flooded wetlands and migratory waterfowl. Delta smelt are reported to be most abundant in Montezuma Slough, Suisun Bay, Suisun Slough, Nurse Slough and the western Delta. Concentrations of sensitive fish species in these critical habitats necessitates screens on intake diversions to help reduce entrainment. The screening program is a synergistic approach in the aid and recovery of many species.

To complete the project, $5 million is required to screen 17 water diversions that distribute water to nearly 8000 acres of diked managed wetlands for wildlife. No third party impacts would be expected.

SRCD is in its second year of an ongoing fish screen program. The operation of five screens have been evaluated, tested and deemed successful and the installation of seven more will follow the same successful path. The funding from CALFED would add a third year to an ongoing program.

SRCD has three water diversion monitoring programs currently ongoing; the Gate Monitoring Program, Fyke Netting Program, and Fish Screen Monitoring Program. Field crews check all water diversions several times per week, in critical habitat areas of the marsh, to ensure that compliance is met. The fyke netting program has been in place for the last two years to monitor the number of fish and species composition being diverted. Both unscreened diversions and screened diversions are monitored to compare the effectiveness of the screens. The screen design was tested by the National Marine Fisheries Service, and consequently was approved by U.S. Fish and Wildlife Service, Department of Fish & Game, and the National Marine Fisheries Service. The screen design has been successful at reducing the inflow of water to 0.2 feet per second, which is the requirement for the delta smelt and less than the requirement of 0.33 feet per second for salmon, and also at keeping fish from being diverted into the seasonal wetlands.

The program has received overwhelming support from many private, state and federal agencies. These include National Marine Fisheries Service, U.S. Fish and Wildlife Service, California Waterfowl Association, Ducks Unlimited, Department of Fish & Game, Corps of Engineers San Francisco branch, and most importantly the private landowners in the Suisun Marsh. The private landowners not only support the program from a biological and ecological standpoint, but they also support it financially. The landowners will be responsible for the cost of operation and maintenance of the fish screen installed on his property. All landowners will have SRCD to train and help them understand the operation of the screen.

II. Title Page

a: Suisun Resource Conservation District
Suisun Marsh Fish Screening Program

b: Suisun Resource Conservation District
2544 Grizzly Island Road
Suisun, CA 94585
Phone (707) 425 - 9302
Fax (707) 425 - 4402
e-mail srcd@castles.com

c: Resource Conservation District - tax exempt

d: State Agency / Federal ID #94-289-7471

e: Suisun Resource Conservation District
Lee Lehman, Executive Director
(see above)

f: Suisun Resource Conservation District
Suisun Marsh Private Landowners
National Marine Fisheries Service
U.S. Fish and Wildlife Service
California Department of Fish and Game
Ducks Unlimited
California Waterfowl Association
U.S. Army Corps of Engineers San Francisco Region
Borcalli and Associates, Inc.
Consulting Engineers
Pacific Engineering Contractors
General Contractors

g: Group 1 Construction of Fish Screens

III. a. Project Description and Approach

Suisun Resource Conservation District (SRCD) proposes to continue implementation of the Suisun Marsh Fish Screen Program. Approximately 30 diversions along Montezuma Slough, Suisun Slough, and Nurse Slough are located within critical habitat areas of Suisun Marsh. Of the 30 diversions, 5 were screened in 1996 and 7 more screens are under construction. The remaining 18 diversions can be remedied with this CALFED grant. Seventeen water diversions would be screened and one diversion would be eliminated. The culverts are manually controlled slide gates used to divert water from tidal sloughs into the managed seasonal wetlands within Suisun Marsh. The 17 culverts are presently unscreened and allow fish to enter the seasonal wetlands through culverts where they eventually become trapped. The screens have been tested and approved by state and federal fish and wildlife agencies. Implementation of this program will include an elevation to determine the potential to downsize or consolidate gravity flow diversions in the Suisun Marsh, to reduce the number of diversions, and an evaluation of entrainment of fish through diversions.

All screen sites have been identified through sophisticated criteria developed for long term implementation of this program by numerous state and federal agencies. Criteria was applied in two phases, biological and nonbiological. The biological criteria identifies critical habitat areas and long term benefits. The nonbiological criteria plays a secondary role in prioritizing diversions after the biological criteria is established. The biological criteria consists of

Location in the Marsh

- Priority 1 - Diversions directly off of Montezuma Slough, without intervening vegetated berms
- Priority 2 - Diversions on Montezuma Slough located behind vegetated berms
- Priority 3 - Diversions on Suisun Slough or Nurse Slough
- Priority 4 - The balance of the Marsh

Size

- Priority 1 - Diversions larger than 36" in diameter
- Priority 2 - Diversions between 24" and 36" in diameter
- Priority 3 - Diversions smaller than 24" in diameter

The nonbiological criteria consists of electrical source, commitment for maintenance, and permanency of diversion. The nonbiological criteria was a secondary way to rank diversions that already ranked high in the biological criteria. After the high priority diversions were selected, a design to withstand the harsh Suisun Marsh environment needed to be developed.

The design - build team was comprised of Suisun Resource Conservation District, Pacific Engineering, Borcalli and Associates, Inc., Intake Screens, Inc., EETS, Inc., and Wetland Construction. The design - build team's innovative design incorporates durable construction to endure in the brackish environment, and the intricacies of electronics for a constant flow in the ever changing tides. The screen materials are stainless steel, fiberglass and polyethylene to prevent corrosion in the brackish Suisun Marsh sloughs. The stainless

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steel screen is a conical configuration with rotating brushes driven by a submersible motor. These motors are driven by line power where available, or solar power when necessary and the brushes clean the screen face for 5 minutes every hour. The screens are designed for easy removal for inspection, servicing and removal during summer months when salinities are high and when no water is being diverted to extend the life of the screen by reducing corrosion. This will allow maintenance and increase the longevity of the screens.

The tidal action in the Marsh creates an interesting problem; the ever changing head pressure of the tides. A flow meter is connected to a gate motor regulator that senses the increases and decreases in head, which in turn raises and lowers the gate to ensure the flow of 0.2 feet per second so that fish requirements are met. As the water level rises to a set level in the seasonal wetlands, a float sensor signals the gate to shut down and stop diverting water. The gate operation is fully automatic and not only keeps the fish from being diverted into the wetlands, but also helps to manage the wetlands by keeping the water level constant.

The third year of the program would eliminate fish entrainment from 17 water diversions in the Suisun Marsh. SRCD's CALFED proposal is to screen 17 high priority water diversions in the Suisun Marsh that are currently a stressor in the Bay - Delta restoration. The third year of the screening program would screen virtually every property diverting water in critical habitat areas of delta smelt and chinook salmon.

b. Location and/or Geographic Boundaries of the project

The Suisun Marsh is 116,000 total acres of which 52,000 acres is diked managed wetlands, 27,700 acres is upland grasses, 6,300 acres is tidal wetlands, and 30,000 acres is bays and sloughs. The Suisun Marsh lies at the confluence of the Sacramento and San Joaquin Rivers in the tidally influenced mixing zone of saline ocean water and the fresh water runoff of the rivers.

Suisun Marsh, Solano County, California (See exhibit A)

c. Expected benefits

The focus of the Suisun Marsh Fish Screen Program is the protection of fish from entrainment when water is diverted from marsh sloughs into seasonal wetlands. The fish species that inhabit the tidal perennial aquatic habitats in the Suisun Marsh include the winter-run chinook salmon (federally listed endangered), spring-run chinook salmon, steelhead trout (federally proposed endangered), delta smelt (federally listed threatened), longfin smelt, Sacramento splittail (federally proposed threatened), and green sturgeon.

The primary benefits of the Suisun Marsh Fish Screen Program include the recovery of federally listed and proposed-listed species wherein population numbers are anticipated to increase and exceed goals set by regulatory agencies. Future potential listings of fish species will also be avoided. Furthermore, because the fish screens will allow private landowners to divert water during critical plant growth periods, other species including migratory waterfowl and shorebirds will benefit by exploiting the resulting diverse, productive habitat of seasonal wetlands.

d. Background and Biological/Technical Justification

The Suisun Marsh Fish Screen Program is a long-term project designed to assist in the recovery of fish populations in the Suisun Marsh, particularly endangered and sensitive fish species. For example, the federally endangered winter-run chinook salmon, which has declined since the 1960's, migrates through the Suisun Marsh from November to mid-

June. Montezuma Slough, the principal slough within Suisun Marsh, has been identified as an important corridor for this species. The delta smelt, also a federally listed species depends on the shallow water habitat in the Suisun Marsh for feeding, spawning, and rearing (Exhibit B). In 1994, the UC Davis Fisheries Monitoring Program found delta smelt primarily in Nurse and Suisun sloughs with the highest numbers occurring in Nurse Slough.

Water is diverted from the sloughs in the Suisun Marsh, through culverts to flood seasonal wetlands for water-dependent wildlife. Fish occurring in these sloughs are vulnerable to entrainment through unscreened diversion culverts. Researchers hypothesize that fish entrained into seasonal wetlands eventually die as a result of unsuitable fish habitat conditions within the wetland's water diversion systems. The fish screens will prevent the incidental take of winter-run chinook salmon and delta smelt. Benefits accrued from screening culverts and water diversions under this program will substantially reduce salmon and smelt mortality and help fulfill the goals of the recent Section 7 Biological opinions for the Suisun Marsh by the U.S Fish and Wildlife Service and the National Marine Fisheries Service. Furthermore, impacts to other salmonids will be reduced and future listings may potentially be avoided (eg. Sacramento splittail).

The Suisun Marsh Fish Screen Program will also ensure the maintenance of seasonal wetlands in the Marsh that are important to a diverse assemblage of wildlife including listed species such as the salt marsh harvest mouse. Screening will also allow for the ongoing, proper management of seasonal wetlands in the Marsh. Consistent with the "ecosystem approach", this program will ensure the long-term viability of habitat for fish, waterfowl, waterbirds and all other water-dependent species. Without the implementation of the Suisun Marsh Fish Screen Program, the present operating schedules of diversions will not be possible because federal biological opinions severely restrict water diversions through unscreened diversions. Without properly timed water management schedules, the long-term sustainability and viability of the Suisun Marsh will be compromised.

The Suisun Marsh Fish Screen Program is a continuing project that is now in the second year of operation with five screens installed in the first year in 1996 and seven screens installed this year. With financial support from CALFED, 17 screens are scheduled to be installed directly off of and behind the vegetated berms on Montezuma Slough (Priority 1, Priority 2), and on Suisun and Nurse Sloughs (Priority 3).

Three million dollars acquired from CVPIA, Cat III, Four Pumps Agreement, SRCD and Suisun Marsh private landowners has been expended to date on the fish screens installed in 1996 and 1997.

e. Proposed Scope of Work

Phase one and two of the screening program has been to screen the highest priority diversions in the marsh and our goal, if funded under CALFED, is to have priority 1, 2 and 3 diversions in the Suisun Marsh screened. This goal would take the design, construction, and installation of 17 screens in 1998. The project would cost $5 million and would protect and enhance nearly 8000 acres of managed wetland with no impact to the delicate fisheries. Design and planning would start in February and March with construction and installation taking place July through September. The fish screen design has already been evaluated, tested and approved by NMFS, DF&G, and USFWS.

f. Monitoring and Data Evaluation

SRCD has three monitoring programs currently ongoing; the Gate Monitoring Program, Fyke Netting Program, and Fish Screen Monitoring Program. Field crews check all water diversions in critical delta smelt and chinook habitat areas of the Suisun Marsh, during water restrictions, to ensure that compliance is met. Diversions are checked multiple times per week and if noncompliant, a letter is sent to the landowner, USACOE SF branch, NMFS, and USFWS.

The Fyke Netting Program has been in place for the last two years to monitor the number of fish and species composition being diverted into the managed wetlands. Both unscreened diversions and screened diversions are monitored to compare the effectiveness of the screens. The screen design has been successful at reducing the inflow of water to 0.2 feet per second, which is the requirement for the delta smelt and less than the requirement of 0.33 feet per second for salmon, and also at keeping fish from being diverted into the managed wetlands. The screen design was tested by the National Marine Fisheries Service, and consequently was approved by U.S. Fish and Wildlife Service, Department of Fish & Game and the National Marine Fisheries Service.

The fish screen program has incorporated a computerized monitoring system into each phase of the program. This system monitors flows, battery levels and pond levels as well as gives alarms for excess or unwarranted flow, cleaning brush malfunction, and motor failure on each screen. Every 15 minutes the screens send information back to the base computer located at the SRCD office. This allows any problem to be taken care of immediately. All of this information is stored on the hard drive and then downloaded to floppy disk to maintain an archive of past performance of each screen.

g. Implementability

There will be no implementation that has not been taken care of for this project. All permits are in place and the project can proceed immediately upon funding.

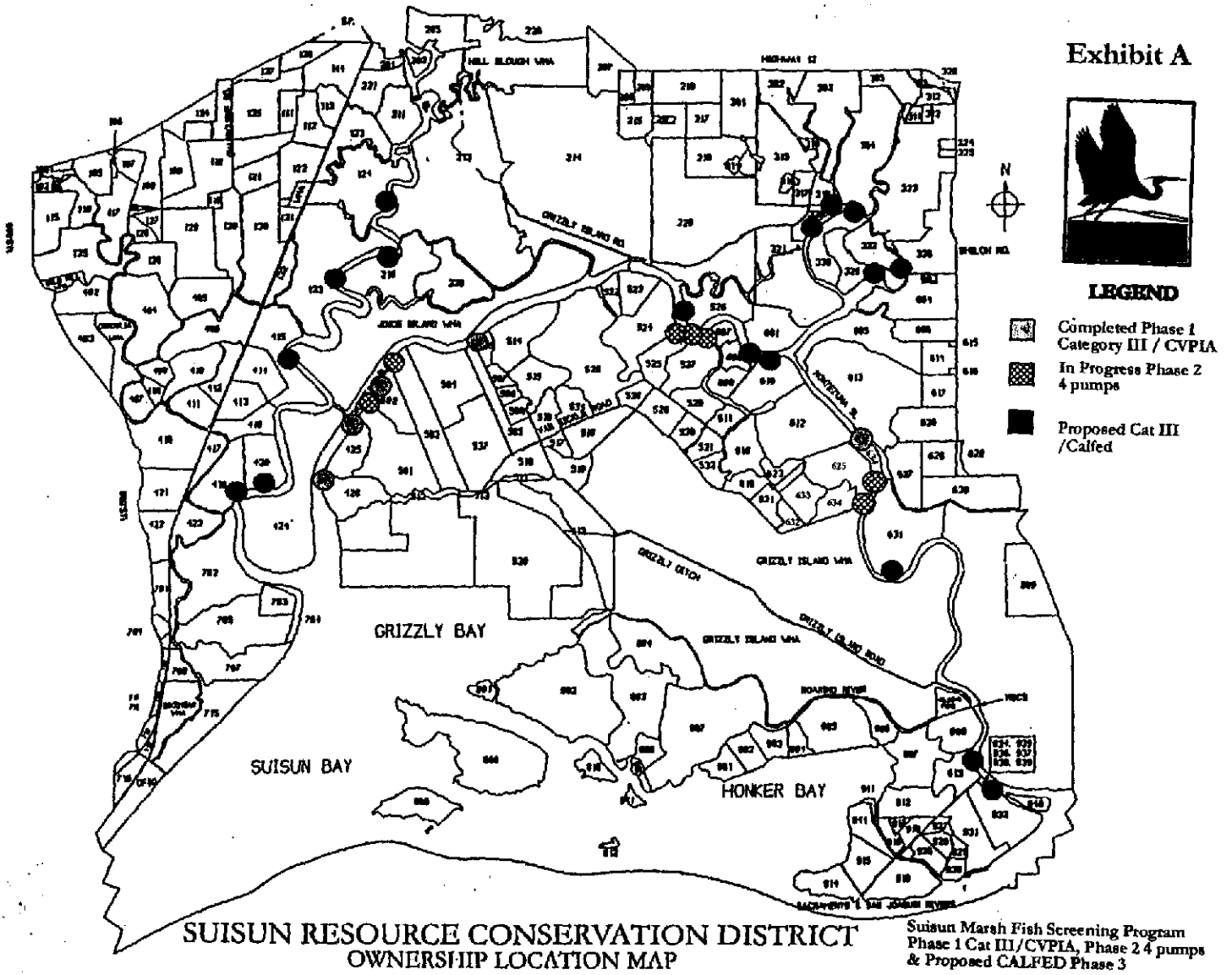
Environmental Permits:

1. SRCD U.S. Army Corps of Engineers Regional Maintenance permit (PNR 20066E98)
2. National Marine Fisheries Service
   Endangered Species Act Section 7 Consultation
   Biological Opinion Dated September 21, 1994
   Winter-run Chinook Salmon
3. U.S. Fish and Wildlife Service
   Endangered Species Act Section 7 Consultation
   Biological Opinion Dated August 29, 1994
   No. 1-1-94-F-20 Delta Smelt
4. Salt Marsh Harvest Mouse Case No. 1-1-86-F-27
   dated March 14, 1986
5. California Clapper Rail Case No. 1-1-94-I-841
   letter dated May 2, 1994
6. Department of Fish and Game will make on site inspections for rare plants prior to start of construction

Technical: Plans and specifications can be prepared with signing of a contract

Biological: None - Management plans have been prepared for each

	private property
Legal:	None - Landowner will be willing to sign agreement for fish screens
Water rights:	None - Suisun Marsh does not require water right. SWRCB have set water quality standards for the Suisun Marsh
Right of way:	None will be required
Environmental:	All environmental requirements have been satisfied with the installation of fish screens
Local Support:	The fish screens have the support of the following organizations: Suisun Resource Conservation District Suisun Marsh Private Landowners National Marine Fisheries Service U.S. Fish and Wildlife Service California Department of Fish and Game Ducks Unlimited California Waterfowl Association U.S. Army Corps of Engineers San Francisco Region



Water Management vs. Sensitive Species Presence in the Suisun Marsh

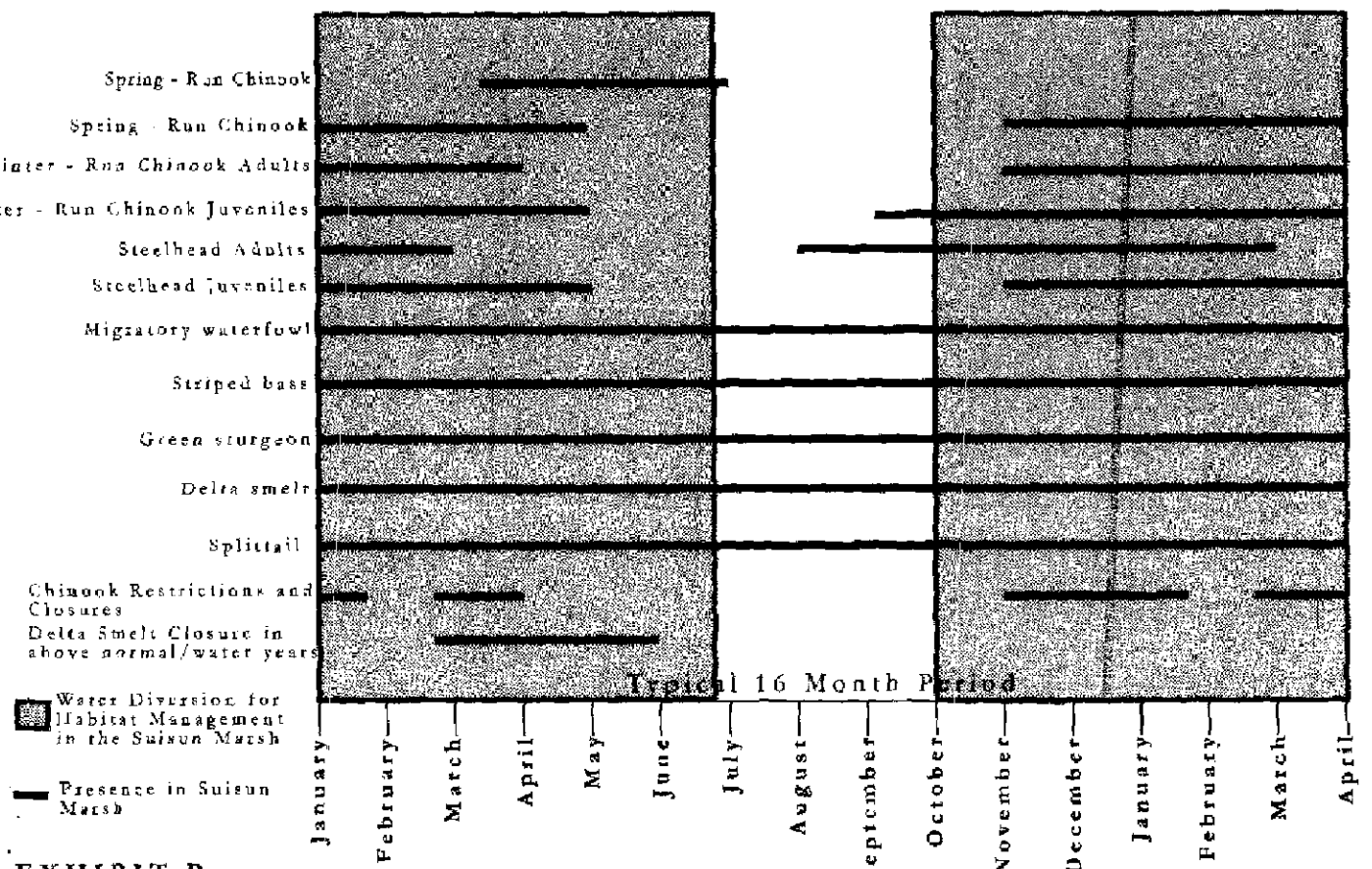


EXHIBIT B

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Suisun Resource Conservation District
Suisun Marsh Fish Screen Program

IV.

BUDGET FOR 17 FISH SCREENS

ITEM	Unit Cost $/ Diversion	Total Amount $
PROJECT MANAGEMENT		
Manage Project	2,000	34,000
Coordinate with SRCD and Landowners	5,500	93,500
Coordinate with Regulatory Agencies	200	3,400
Subtotal	**7,700**	**130,900**
PROJECT DESIGN		
Perform Surveys and Maps	1,700	28,900
Prepare Construction Plans and Specifications	16,100	273,700
Prepare Construction / Fabrication Documents	5,700	96,900
Subtotal	**23,500**	**399,500**
PROJECT CONSTRUCTION/FABRICATION		
Perform Construction Management /Quality Control	17,000	289,000
Fabricate, Manufacture and Purchase Goods	127,000	2,159,000
Construct Project and Install Goods	93,700	1,592,900
Prepare Operations and Maintenance Manual	217	3,700
Test Facilities and Deliver to SRCD	3,000	51,000
Bonds and Insurance	8,000	136,000
Subtotal	248,917	4,231,600
Contingency	14,000	238,000
TOTAL	**294,117**	**5,000,000**
Landowner Contribution (in kind service for operation and maintenance)	**10,000**	**170,000**

The project design work will begin in February and March and construction of the 17 screens will take place June through September. There will be no third party impacts with the construction of the screens.

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V. Applicant Qualifications

The design - build team of the Suisun Marsh Fish Screening Program is a cooperative effort involving Suisun Resource Conservation District, Pacific Engineering, Borcalli and Associates, Inc., Intake Screens, Inc., EETS, Inc., and Wetland Construction. These organizations designed the fish screens to comply with the Department of Fish & Game, National Marine Fisheries Service and U.S. Fish and Wildlife flow requirements as well as to maximum useful life, to minimum power requirement, to optimize constructability, and to minimize construction, operation and maintenance costs. This collaborative design has been approved by National Marine Fisheries Service, Department of Fish & Game, and U.S. Fish and Wildlife Service.

SRCD not only has two years of a successful screen program under its belt, but we also possess the communication and support of the Suisun Marsh private landowners. This close relationship allows this program to be prompt and successful. We work side by side with the landowners to help maintain the existing screens and manage the seasonal wetlands for optimal wildlife value. SRCD also possesses the equipment to assist the landowners in operation and maintenance of the screens.

SRCD currently possesses the equipment to both monitor and maintain the fish screens. The computer system, software and radio tower for 24 hour surveillance has already been installed at the SRCD headquarters and is in use. The new screens would be linked by reprogramming the software of the existing system. A boom truck was purchased to lift the screens off and set them on the platform for servicing, as well as tools and equipment including a power washer, a 500 gallon water tank and generator to charge batteries.

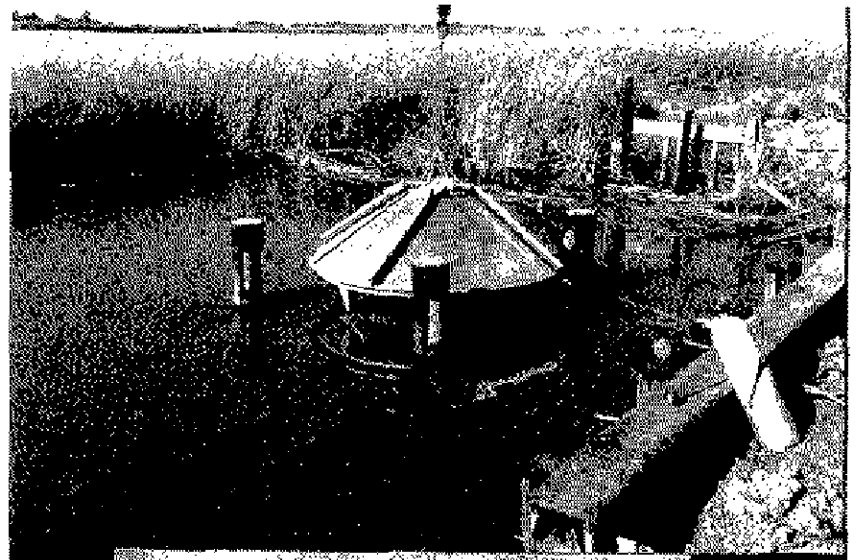
The five prototype fish screens that were installed in 1996 are successfully functioning with the approval of NMFS, DF&G, and USFWS along with SRCD and the landowners who are benefiting from them. The screens under construction will be functioning in the fall of 1997, as landowners flood their properties. The twelve screens are now protecting over 5300 acres of seasonal wetlands. The CALFED grant money would install 17 more and increase our protection of over 13,000 acres of managed wetland.

With the addition of the Department of Fish & Game and Department of Water Resources over 30,000 acres or 60% of the managed wetlands in the Suisun Marsh would be protected with fish screens and would therefore reduce the impacts on sensitive fish populations.

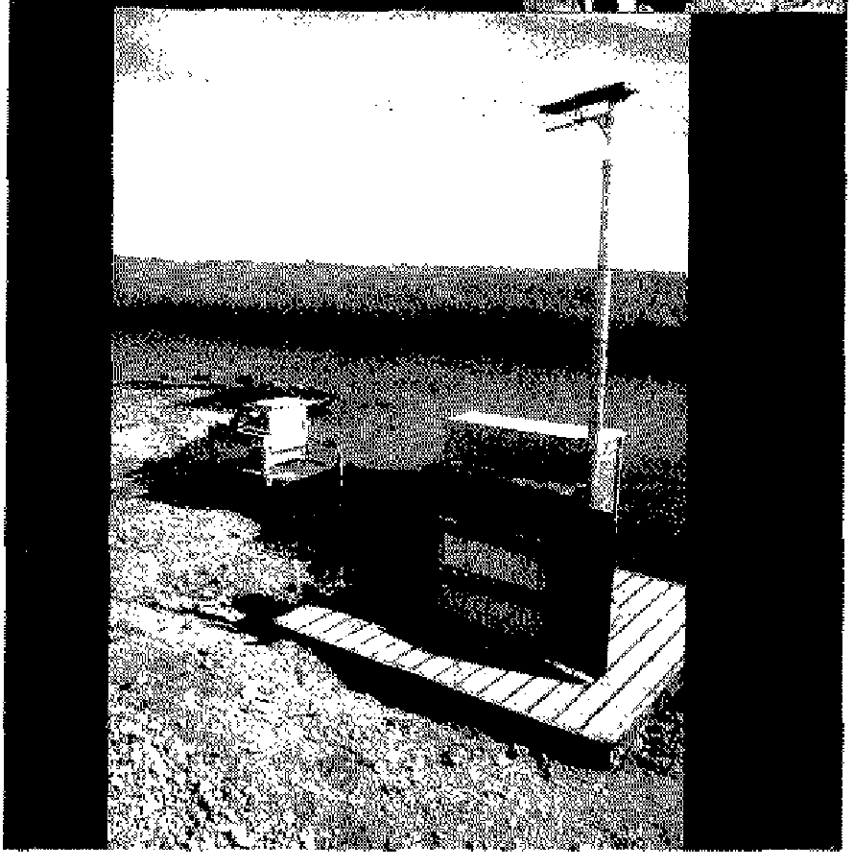
SEE PHOTOS OF ACTUAL SCREENS

A. Fish screen being installed
B. Inside the levee, the flow regulating gate, computer sending unit and battery bank
C. A solar site with maintenance platform
D. The total site, fish screen on the right and control boxes on the left

A.



B.



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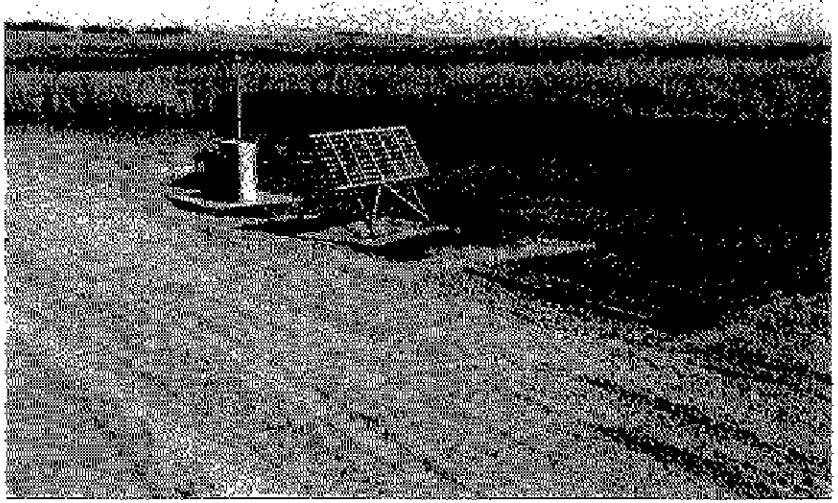

D.

VI. Compliance with terms and conditions

The Suisun Resource Conservation District is a state agency and no forms are required before the project is approved. The terms and conditions are agreeable and will be complied with by the Suisun Resource Conservation District.